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CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 5 April 2004 with an application for Letters Patent number 532110 made by CHARLES CAULDER BREE.

Dated 11 April 2005.

Neville Harris
Commissioner of Patents, Trade Marks and Designs

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Patent No. 4 - Provisional Specification

(a) Modular Polyethylene Boat Building System

I (~~or We~~),
(b) Charles Caulder Bree of 1 Kohera Road, RD2, Mercer 1871 a New Zealand Pakeha.

do hereby declare this invention to be described in the following statement:

(c) *continue application on page 2*

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(c) Here begin description of the invention in as much detail as possible, revealing all the essential features. The continuation of the specification should be upon paper of the same size as this form on one side only, with the lines well spaced and with a margin of 4 cm on the left hand part of the paper. The specification must be signed at the end.
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MODULAR POLYEHTYLENE BOAT BUILDING SYSTEM

A modular design and method of building both large and small Rotationally moulded boats using basic shapes, comprising a number of individually watertight compartments fixed together to form a larger complete boat. More units can be added to extend the size. Each module Rotationally moulded in one piece.

The system design comprises of longitudinal shapes with a primarily hexagon cross section.
The intention is to achieve a unit that the average person can stand up in, this means the units must be more than the height of a person between the flats of the hexagon.

Giving great strength when these units are bolted end to end, hexagon to hexagon. These units could also be connected together side by side by fixing through the longitudinal faces, forming a honeycomb effect.
Welded or bolted together, suitable fixings such as rivets may be used or a combination. The joint is very strong as fixings in positions around the extreme edges of the hexagonally shaped perameter, minimising the loading on fixings, because of their distance apart, diameter of the fixing points on the flats of the hexagon.

As other sections are fixed side by side and end to end, the integral strength of the unit increases providing the ability to produce multi stacked units or very wide units, and still maintain strength relative to size.

Various designs of boats can be achieved by this system, depending on how the components are assembled.
Utilizing these options provides the ability to form products such as a large Catamaran used in this application as an example.

PURPOSE OF INVENTION

Is to utilize the Rotational Moulding system limited by size of Oven, to produce large units such as varying Boat configurations.
Accommodation unit for Water or Land, which can be transported in separate modules and assembled at the destination.

To provide a method of building larger boats not previously achievable in polyethylene.

The prime reason for this Patent Application was to use this system to build a large Catamaran, but not solely, utilizing three large hexagonal tubes, each tube made up of longitudinal modules bolted together at the module ends, forming bulk heads.
Two hexagonal modules incorporating a bow section and another forming an observation cabin, as per the example.
The intention is to mould one piece modules large enough to create full head height accommodation with the ability to be fixed together in various configurations to be practical and useful, both on land and in water.

The hexagon cross section was chosen for various reasons.

1. Hexagon will enduce a good flow for the powder when rotating during the moulding process, producing a more even wall thickness.
2. Provide good sized fixing areas when assembling side by side. A round tube for instance would be difficult.
3. The hexagon keep flat areas to a minimum size to help prevent distortion that tend to be a problem with large flat areas, lets say a square cross section.
4. Hexagon shapes provide a good sea going hull shape naturally.

The hexagonal faces would be bolted together side by side to form three longitudinal tubes, each tube large enough across the flats of the cross section hexagon for a Human to stand up in with clearance.

All three main compartments required to produce the main body of the Catamaran design for instance, would be achieved with three basic moulds. One mould with a parallel hexagonal end, at each end of the unit. Another with a bow section at one end and a hexagonal end at the other. The third being a suitable shaped nose section at one end and a flat faced hexagon at the other end.

TECHNICAL FIELD

This invention relates to boats, though not solely their design and method of manufacture.

BACKGROUND ART

Traditionally larger boats are manufactured by fabricating from a base through to a one-piece product, aluminium or timber. Fibreglass being laminated in a mould in one piece. These methods tend to be labour

intensive and thus expensive, quality control is an ongoing issue. Transporting larger vessels is always a problem.

ALL REFERENCES, including any patents or patent applications cited in this specification are hereby incorporated by reference. No admission is made that any reference constitutes prior art. The discussion of the references states what their authors assert, and the applicants reserve the right to challenge the accuracy and pertinency of the cited documents. It will be clearly understood that, although a number of prior art publications are referred to herein, this reference does not constitute an admission that any of these documents form part of the common general knowledge in the art, in New Zealand or any other country.

It is therefore an object of the present invention to provide a boat design and method of manufacture which will go at least some way to overcoming the above disadvantages, or which will go some way towards meeting the above desiderata, or which will at least provide the industry with a useful choice.

DISCLOSURE OF INVENTION

Accordingly, in the first aspect the invention may broadly be said to consist in a boat design comprising of :

Rotationally moulded modules
modular construction
individually sealed watertight modules
modules that bolt together in different configurations to achieve varying finished unit designs
Elongated modules with a hexagonal cross section

BENEFITS

Rotational moulding provides a fast and efficient method of producing large numbers of units with good quality control.

A variety of shapes and designs of boats can be produced simply by re-arranging the configuration of modules.

For example, to produce the Catamaran design offered as an example in this application, three basic moulds are required. The moulds alone can be used with imagination to produce a variety of final products.

Examples: Other boat designs
Floating docks
Floating Islands
Temporary accommodation units for dry land
Barges

When units are bolted together they add strength and rigidity to each other. Essentially for larger boats, but could be used for smaller models.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 is an isometric view of module one, shows an exploded view of module one and it's attachment to module 3.

Figure 2 is an isometric view of module two, shows an exploded view of module two and it's attachment to module 3.

Figure 3 is an isometric view of module three, includes moulding four position of attachment.

Figure 4 shows an end elevation of the Catamaran example, module connection and fixing surfaces.

Figure 5 shows end elevation and side elevation of stern end of Catamaran example, including moulding 4.

Figure 6 plan view of modules assembled to complete Catamaran example.

Figure 7 elevation and plan views of modules to complete Catamaran example.

Figure 8 cross section of fixing point for side by side fixing points & welds.

Figure 9 cross section of fixing points for end to end fixing points & welds.

Figure 10 some possible configurations for use of modules.

Further aspects of the invention will become apparent from the following description which by way of example only and with reference to the accompanying drawing in which:

With reference to the drawings and in particular figure 6, which is a plan view of the Catamaran used as an example of the method of assembly of this modular system. This particular example comprises of three type of module each with a longitudinal hexagonal cross section. One module type three has hexagonal shaped faces at each end, A & A at right angles to it's six longitudinal faces B. There are three of these modules used in the construction of this example, numbered X Y & Z in Fig. 6. There is another type of module shown in figure 2, module two, which has one end (C) with a hexagonal face at right angles to it's longitudinal faces (B). At the other end of the module is configured a bow shape (E), there are two of these modules two, used in this example P & Q. The third module used in this example Fig. 6 is the example in fig. 1 module one, which appears as (R) in Fig. 6.

Assembly of modules:
Fixing the modules together longitudinally bringing the hexagonally shaped flat end A & C as in fig. 2, and bolting around rim on hexagon shape as per Fig. 9, the same as per Fig. 1 with module one and module three fixing faces F & A.

The now assembled units longitudinally can be fixed side by side by bringing the appropriate faces (B) together on each longitudinally assembled modules to form the Catamaran plan in figure 6 and elevation in Fig. 7. Fixing position for longitudinal fixing of the faces BB & BB are shown in fig. 8, position and type of example M in Fig. 8.

Moulding 4 is a moulded extension forming a boarding platform, and engine compartment option. It's longitudinal shape is the extension of the bottom or half shape of hexagon cross section and can also fit into tunnel of Catamaran.

Two of module two, and two of module three forms the hulls or pontoons of the Catamaran. One module one, and one module three forms the upper level of this configuration.
The pontoon or hull can be extended by adding another module three longitudinally, and fixing by the above method.
Moulding four can also be added in the same manor.
All the bolted joints can be welded as per Fig. 8, to keep water out of the joints, and allow hatches and companion ways to be cut through.
Longitudinal panels BB and if necessary the now formed bulkheads C & A formed between the modules.

BEST MODES FOR CARRYING OUT THE INVENTION

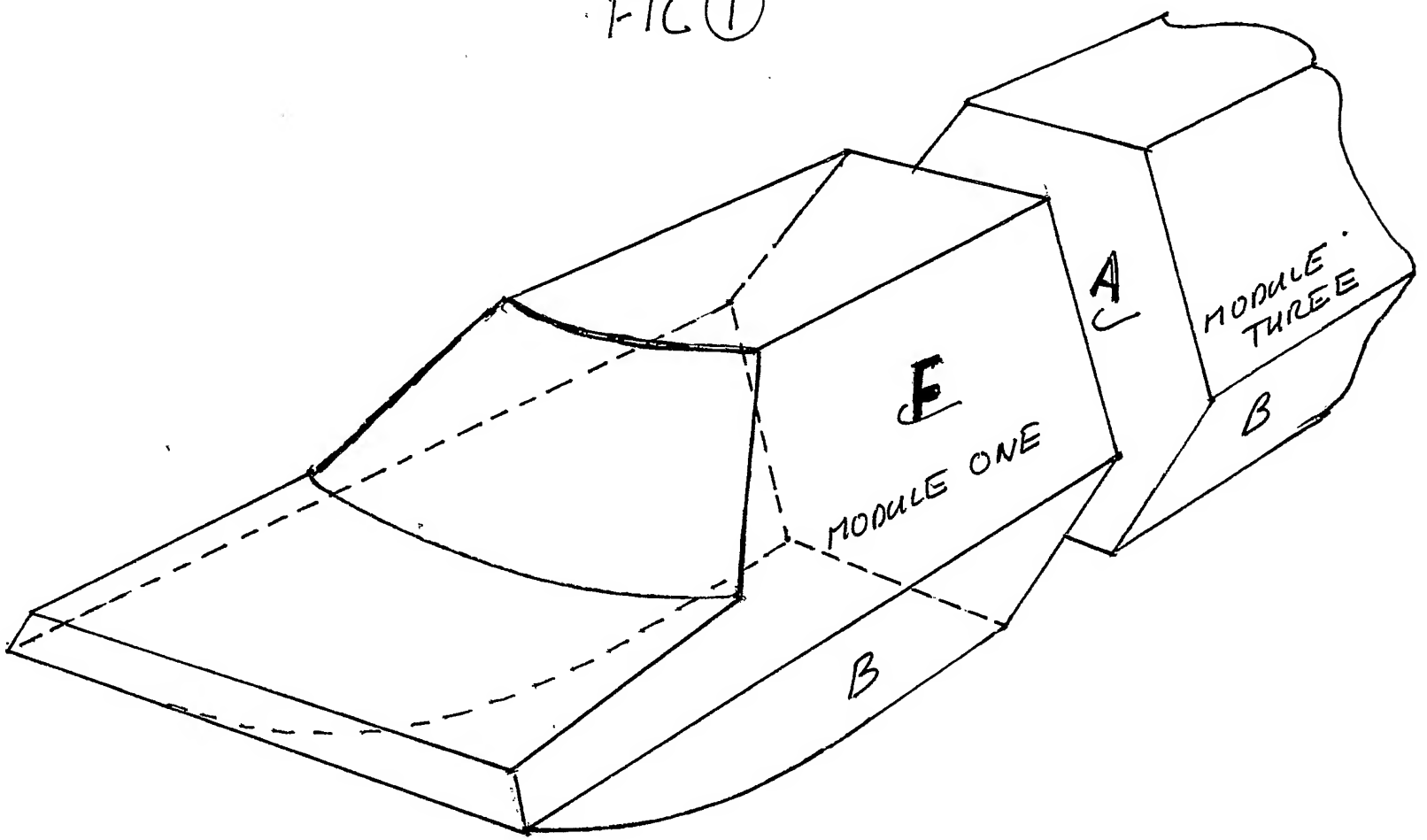
Modules may be formed from a plastic material such as medium density polyethylene (MDPE) which is relatively low cost, substantially resistant to environmental factors (such as ultraviolet breakdown), resistant to chemicals (such as acids) and substantially resistant to impact, does not rot or corrode, unaffected by electrolysis.

Modules having integrally formed walls which may be, for example, between about 20mm to 40mm thick. More preferably the wall thickness may be around 40mm in larger boats for rigidity and impact.

Modules are formed by plastics rotational moulding in which a (for example) two-part mould is made which, when fitted together, defines the external surfaces of the module. The parts of the mould are connected together with an amount of powered plastic material placed in the internal mould space. The mould parts are then heated and rotated.
The flowing powder begins to stick to the hot metal mould as the heat is absorbed into the powder surface more powder adheres until all the powder has melted, forming an even coating at this point on the mould surface. The heat is turned off and the mould is kept rotating until the plastic solidifies.

Eventually, rotation may be stopped and the mould opened to reveal the module which is hollow.

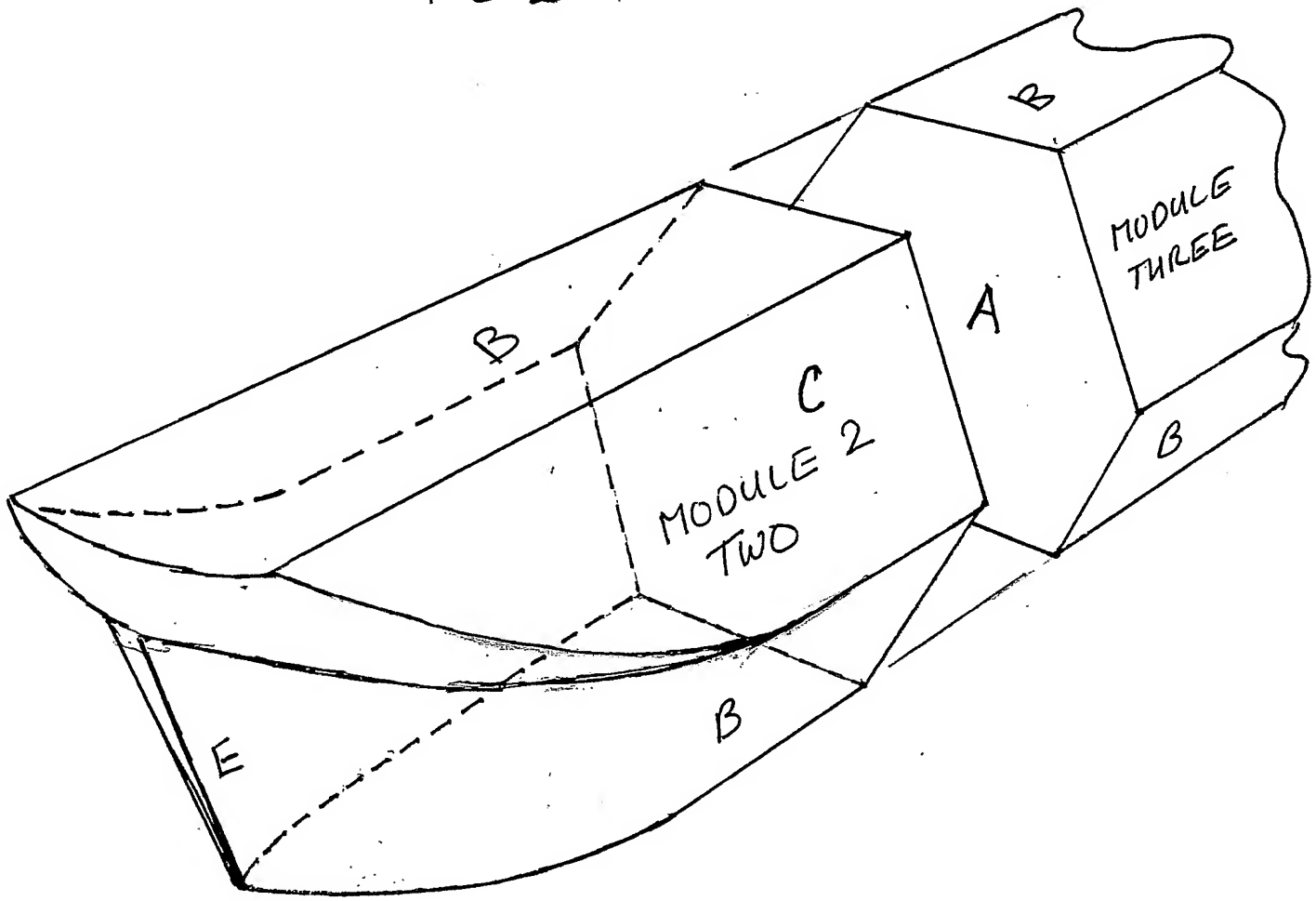
FIG (1)



OBSERVATION MODULE

CATERMARAN EXAMPLE

FIG 2

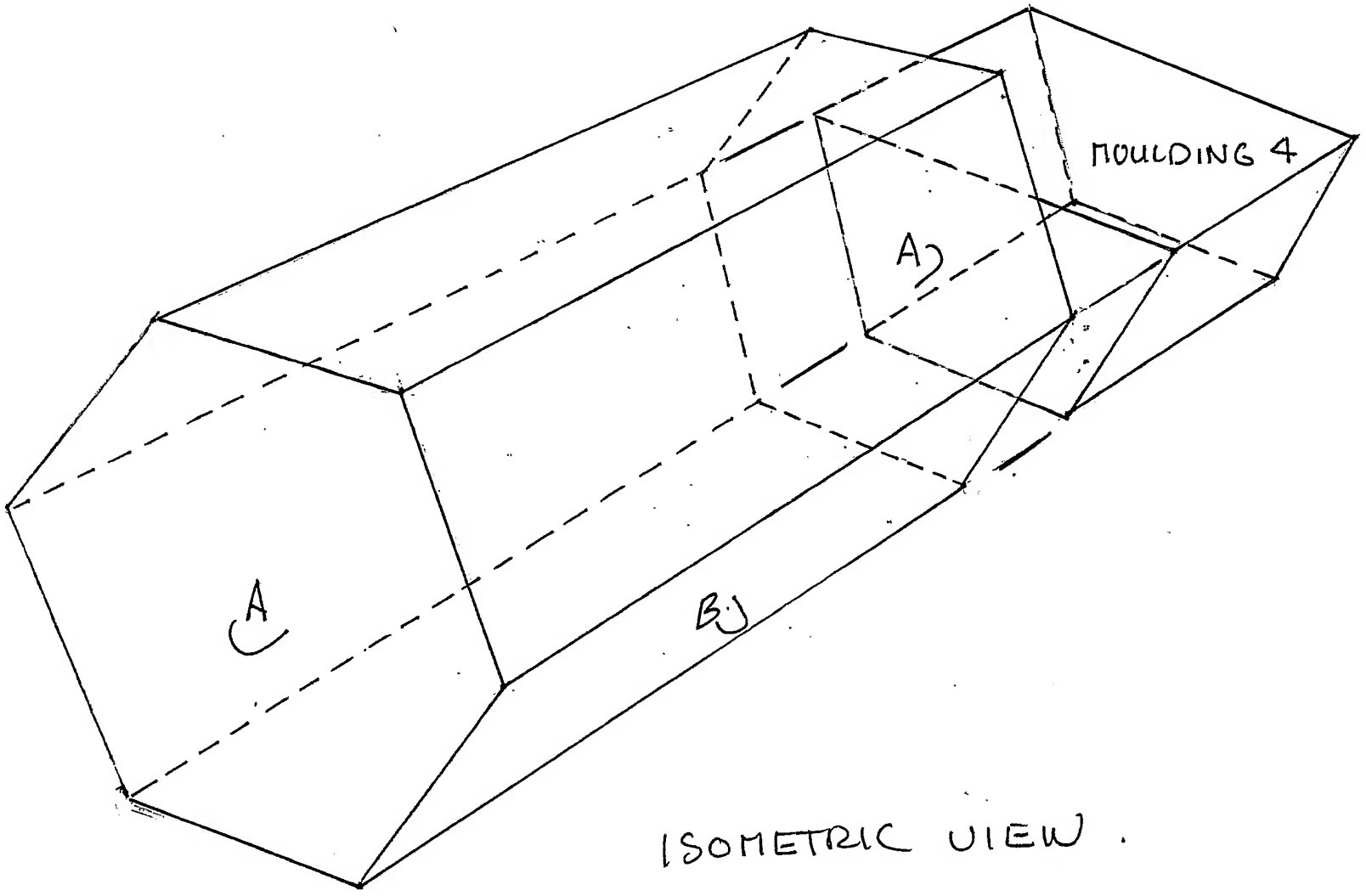


BOW SHAPED MODULE

CATAMARAN EXAMPLE

FIG 3

POD THREE.



ISOMETRIC VIEW.

FIG 8 → FIG 4

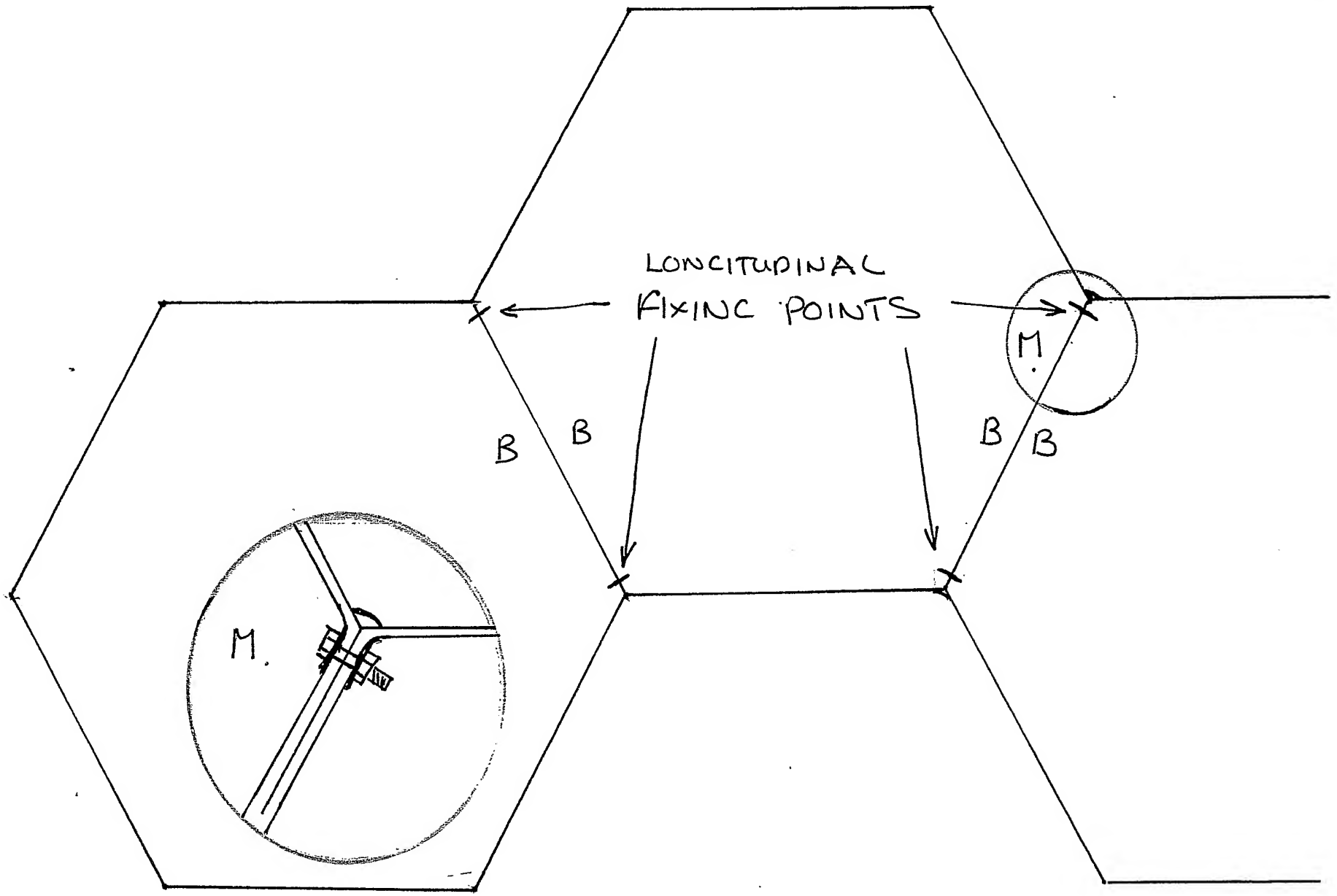
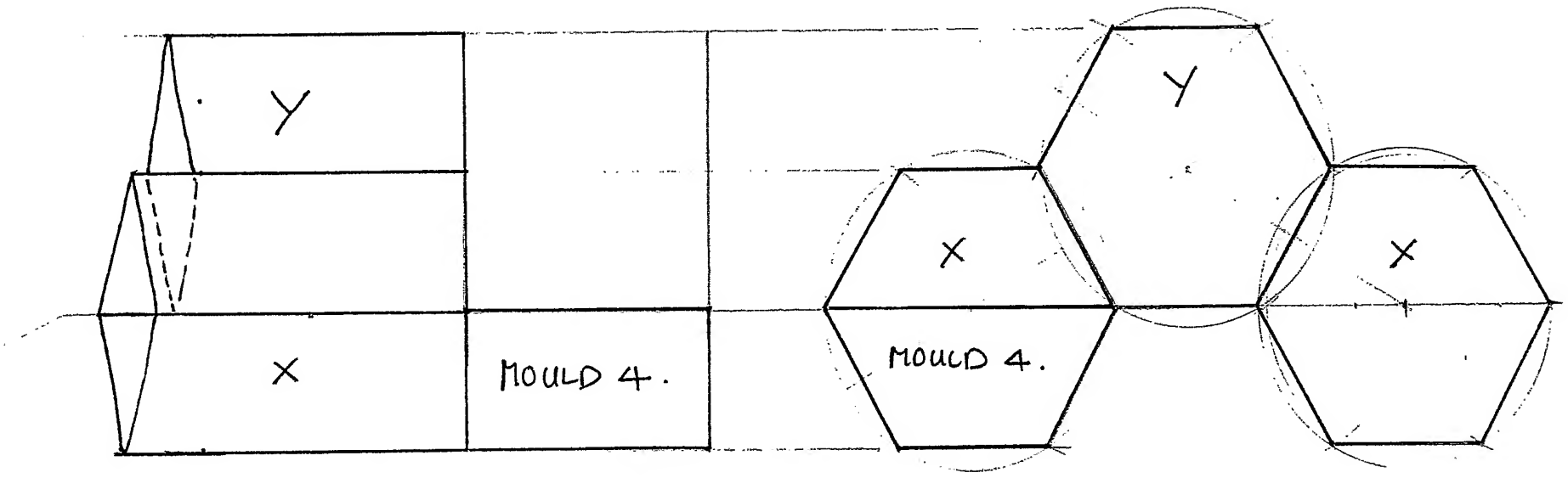


FIG 5.

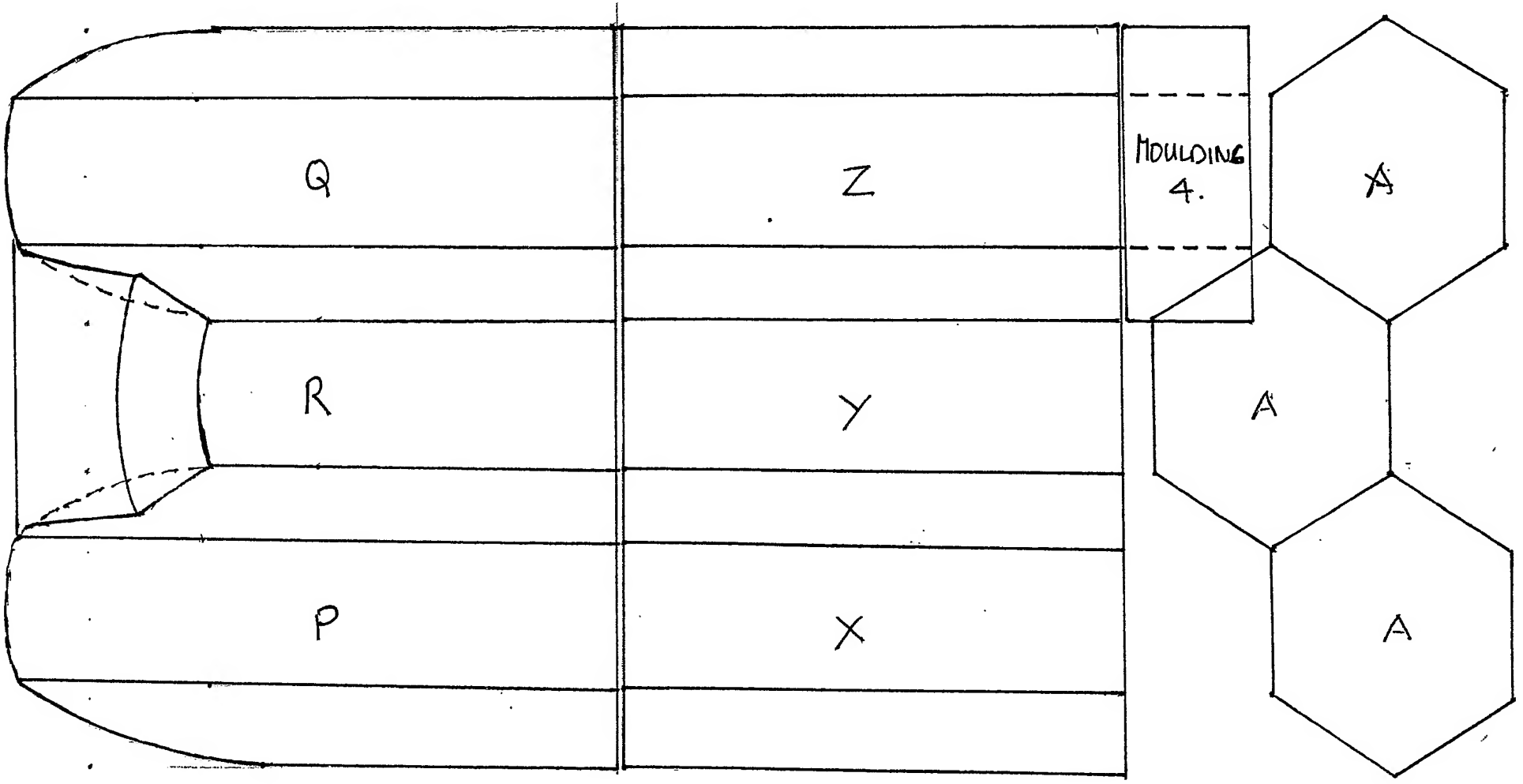


SIDE ELEVATION.

END ELEVATION

FIG 6

PLAN VIEW



CATEMARAN EXAMPLE

FIG 7.

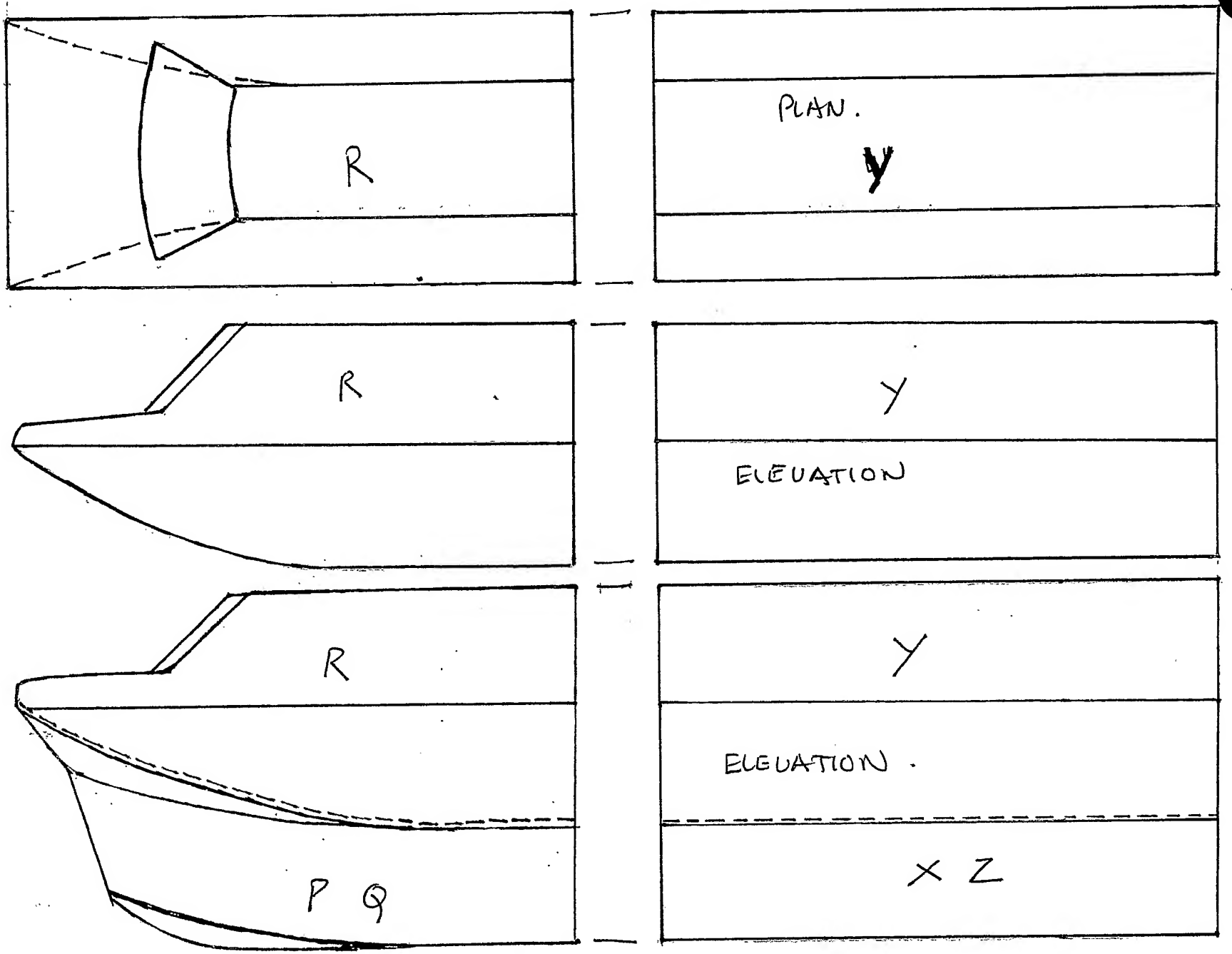


FIG 9.

METHOD OF FIXING MODULES TOGETHER END TO END.

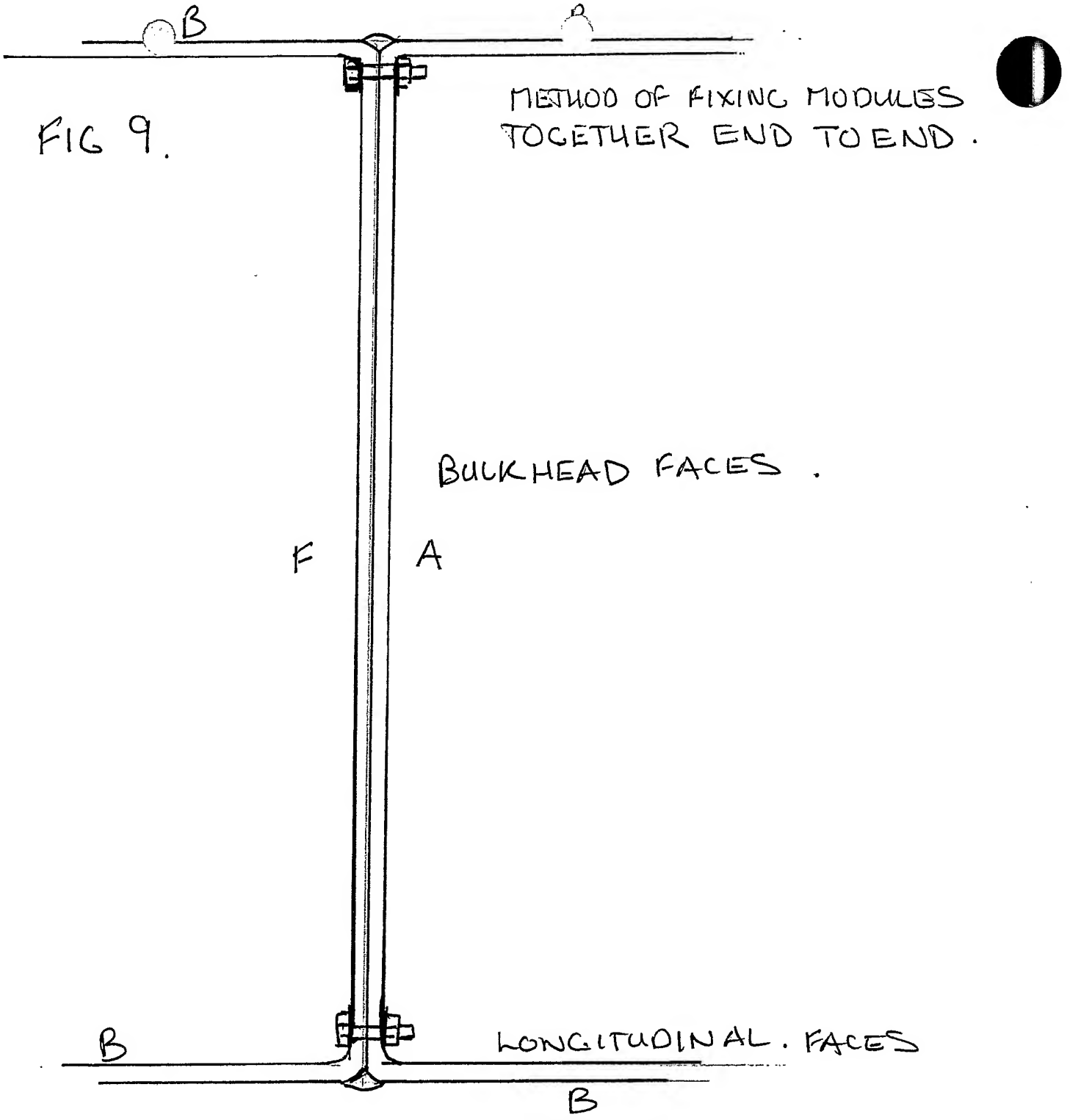
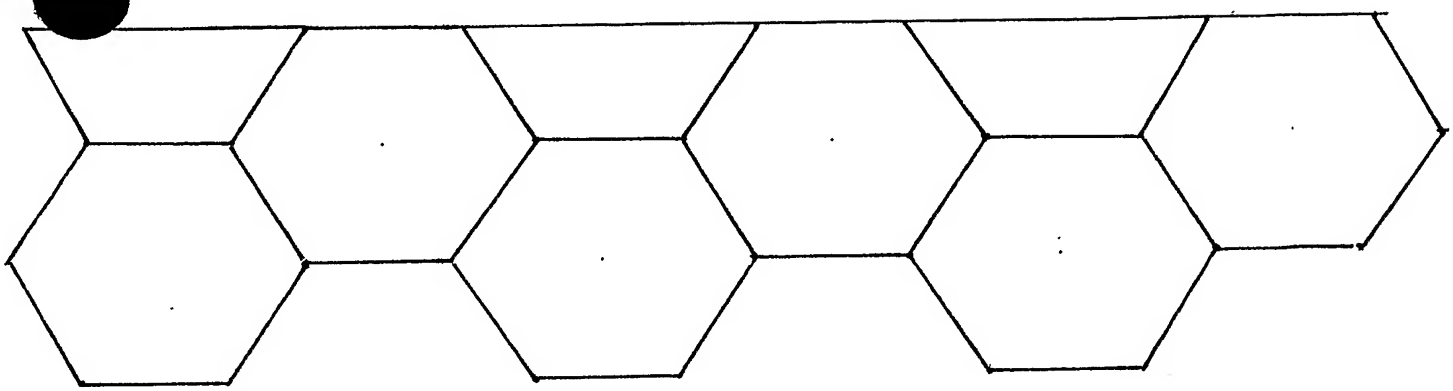
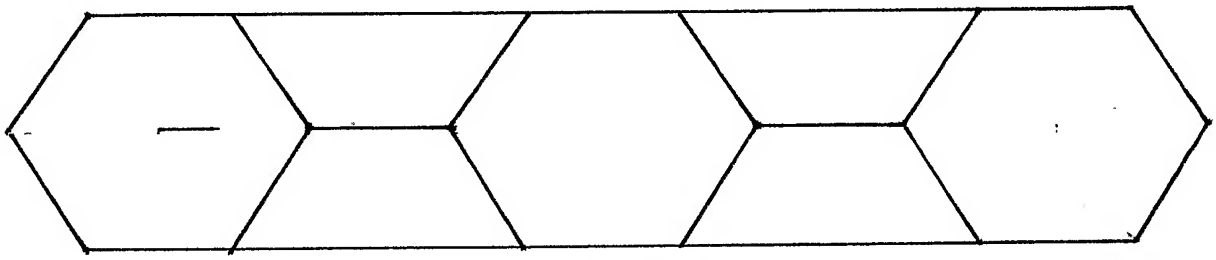


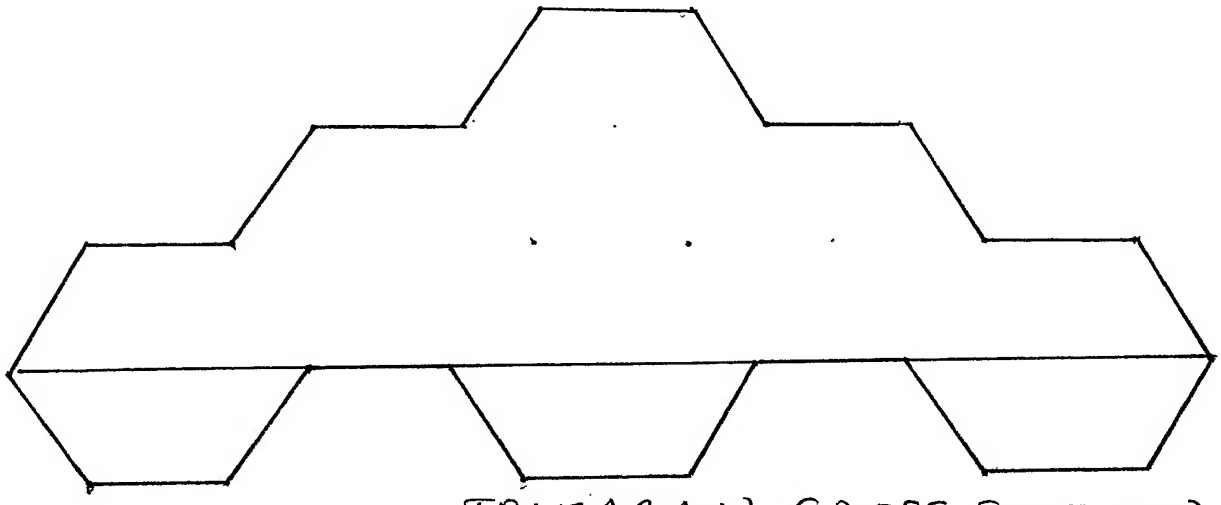
FIG 10.



FLOATING PLATFORM.



FLOATING PLATFORM.



TRIMARAN CROSS SECTION.